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West Europe Report

SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

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SCIENTIFIC AND INDUSTRIAL POLICY

ADVANCED MATERIALS

FIRST CARBON FIBER FACTORY IN FRANCE OPENS

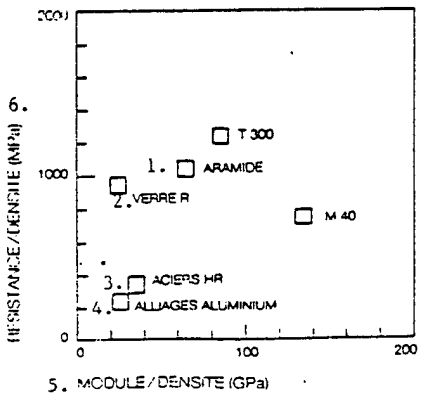
Paris AFP SCIENCES in French 17 Oct 85 pp 59-60

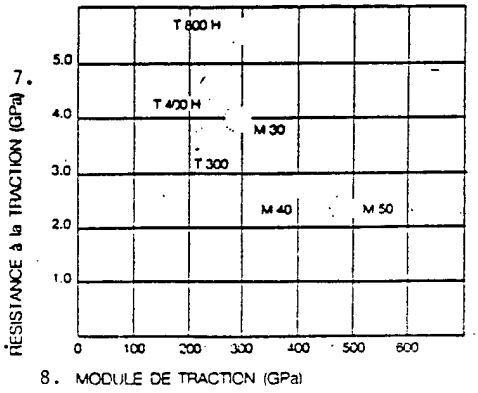
[Excerpt]Abidos--At its opening on 14 October, Minister of Industrial Redevelopment and Foreign Commerce Edith Cresson called the first carbon fiber factory in France and continental Europe, located in Abidos (Atlantic Pyrenees), "an example of Franco-Japanese cooperation."

The factory, she said, "gives us direct access to major technological changes" and "is of great importance to France." Mrs Cresson stressed the fact that, although France is the principle consumer of carbon fibers in Europe, it was not a producer.

The Abidos factory, built in the Lacq Basin by SOFICAR, a joint subsidiary of the French groups Elf (32.5 percent) and Pechiney (32.5 percent) and the Japanese group Toray (35 percent), should produce 300 tons of carbon fibers a year under a Japanese license.

The capacity of the Abidos factory will double during a second phase planned for 1990 and the carbon fiber raw materials, until now imported from Japan, will also be manufactured at the site. "Our ultimate goal is for France to be independent of foreign sources," Rene Sautier, general manager of chemicals for the oil group Elf-Aquitaine, stated.





The principal qualities of the fibers produced: specific resistance and module; module of traction.

Key:
1. Aramid
2. R Glass
3. HR Steel
4. Aluminum Alloys
5. Module/Density (GPa)
6. Resistance/Density (MPa)
7. Resistance to traction (GPa)
8. Module of traction (GPa)

However, the two French groups already at work developing new resins fear that 1986 will be difficult: a new European competitor, ENKA (a German subsidiary of the Dutch group AKZO), which has acquired a license from the Japanese firm TOHO BESLON, will be entering the race.

According to Mr Sautier, SOFICAR, which expects sales of 100 million francs this year, will not achieve financial equilibrium until 1987 or 1988. Two hundred million france have been invested in the factory, which will employ 97 people.

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CSO: 3698/111

BIOTECHNOLOGY

OVERVIEW OF START-UP BIOTECH FIRMS IN FRG

Hamburg DIE ZEIT in German 27 Sep 85 pp 25-26

/Article by Wolfgang Gehrmann/

/Text/ Fort Knox is still unlocked. Because a laboratory building near Heidelberg University has just recently been constructed and the craftspeople have not yet quite finished their work, the lock is still missing at the door to the cellar of Progen Bioengineering Company. That will have to change soon.

Fort Knox -- that is what Progen's research manager, the medical professor Krishan Sethi, jokingly calls the cellar, but with good reason. In the corner stands a hermetically tight special steel container. Frozen in liquid nitrogen, at minus 180 degrees Celsius, the entire capital of the young company is contained therein: cell cultures manipulated by researchers, which are to become new drugs with revolutionary properties -- for the use of medicine and for the economic profit of Progen's financiers.

The enterprise is experimenting with the most recent methods of microbiology. The company itself is also an experiment -- an economic one.

Two years ago, the Heidelberg molecular biologist Professor Ekkehardt Bautz, together with three colleagues, founded Progen. The scientists wanted to copy what their technical colleagues in the United States had shown them a hundred times since the middle of the 1970s: Professors of biology, expert in recently developed techniques of the genetic manipulation of living things, and firm in other recent knowledge of cell biology, started businesses there in which they utilized their knowledge industrially. The most successful of them in the meantime have become world renowned companies: Genentech, Cetus, Genex, and Biogen. In the USA, they have established a new future technology -- bio-engineering -- which will change the industrial world to the same extent as microelectronics is doing.

For two years, it looked as if the Federal Republic would oversleep the development of the new technology. But now -- and the fascinating story of the professors' company Progen vouches for it -- the bioboom is breaking out here too in its full strength. The economic experiment of the Progen founding does indeed appear successful. In any case, it is already finding imitators.

In Hamburg and Duesseldorf, in Berlin and Munich -- wherever renowned molecular biologists are teaching at the universities here -- professors and recently certified biologists have marched to the district court to register their laboratory firms into the Trade Register. Whatever they then develop as research entrepreneurs, they sell to the large companies of those branches where the biorevolution already struck before the turn of the century -- chemistry and pharmacology primarily, but also food producers, the agri-business, and capital goods manufacturers. The number of new bioboutiques can already be estimated at 20 or more, and new ones are constantly being added.

They are called Organogen and Gen-Bio-Tech, Oxo-Chemie and Denagen, Fermigen, Testimmun, and IBL International Biotechnology Laboratories -- just these seven biofirms, together with the branch pioneer Progen, have their head-quarters in Heidelberg. The university city at the Neckar clearly is the German center of the biological technology of the future.

But competition is already stirring in the land. Bioengineering is becoming the field of a new national economic north-south competition. In Hamburg, the medical professors have founded the biofirms Zellbiotech, Chemikon, KK Bio-analytik, and Promeditec. In Duesseldorf, the new Gen-enterprises are called Rheinbiotec and Diagen, and in Berlin and Munich, the first biolaboratories are opening.

The fact that Heidelberg is ahead of the competition is not a matter of accident. Nowhere else do so many scientists work in the biological disci-plines. Besides the university institutes and the laboratory firms, the Max-Planck Institute for Cell Biology and Medical Research, the European Molecular Biological Laboratory, the German Cancer Research Center, and the Center for Molecular Biology, erected jointed by the province of Baden-Wuerttemberg and the university, are all headquartered there.

Furthermore, the Baden-Wuerttemberg provincial government has implemented a courageous technology policy and thus quite early on created favorable conditions for the high-tech firms of the biobranch. In particular, the minister-president Lothar Spaeth used his power to eliminate the barriers between the university and industry, and reduced the fear of contact between managers and professors.

Before German professors can become entrepreneurs who turn their knowledge into money, they must deal with the bonds of bureaucratic law. Civil servants must have their side jobs approved. Their dedication to research and teaching should not suffer because of their striving for private profit. What is discovered in the university laboratory, financed by the tax payer, should not become coin for personal gain.

Ekkehardt Bautz, too, had to wrestle for months with the university bureau-cracy before he received permission, in August of the past year, to act for one day per week as consultant but not as manager for his company Progen. Lothar Späth, using his authority as ministerial president, was instrumental

in giving victory to the view that the professor's private business could certainly be useful to the overall national economy, and thus in the public interest.

"That was the breakthrough," summarizes Progen Business Manager Bodo Spiekermann. Suddenly the financiers took the bait. Before this, Spiekermann had to lobby for a long time and in vain at the meetings of the heads of the German chemical and pharmaceutical industry, to obtain investors for the professorial enterprise. The managers did not want to see that the entry into the biobusiness was pressing.

But these views have surely thoroughly changed. The top adversaries of industry now belong among the corporate members of Progen. The following have contributed at least 1 million mark each:

o The pharmacological business Boehringer Mannheim,

o The cosmetics group Klosterfrau,

o The Roland Oetker Investment Company,

o The GFI Society for Industrial Interests and Investments, which belongs to the Herbert Quandt Group,

o And a venture capital fund of City Corp.

Investment negotiations are about to be concluded with the mixed conglomerate Carl Freudenberg.

The professorial knowledge, which has materialized in the cryogenic treasure in Progen's "Fort Knox", gives a hint of how the new bioengineering skills will revolutionize medicine and industry. Three cancer detection agents are among the first saleable products of the Gen-company. These will permit tumor diagnosis with previously unattainable reliability and speed. Progen's production program in the near future comprises skin-growth factors, by means of which natural skin for transplants can be grown in cell cultures, or a diagnostic agent for chlamydien -- the most widespread venereal disease in the USA, whose frequent occurrence has only recently been detected at all due to monoclonal antibodies.

This research effort on the part of the professors, stimulated by the lure of personal wealth, naturally can become a biological brainstorm for the industry only because Progen is not alone in the field. Encouraged by the good Heidelberg example, professors who wish to market their bioengineering know-how are everywhere finding political subsidies and generous financiers from industry.

Surprisingly, Duesseldorf, the capital city of Northrhine-Westphalia, may become the most interesting competitor of Heidelberg as the cell nucleus of the nation. The ministerial president Johannes Rau would be delighted to

picture himself as the person who assisted the industrially outgrown province at the Rhine and Ruhr to achieve a new economic miracle.

In the best chemical neighborhood, in the shadow of the Hendel Works in the Duesseldorf borough of Reisholz, the craftspeople are therefore just as active as at Progen in Heidelberg: the biofirm Diagen is constructing its new laboratories there.

The managers of Diagen, chemical engineer Metin Colpan and the biologists Karsten Henco and Juergen Schumacher, are just 30 years old. They are implementing a plan which they already conceived in 1976 during their shared studies in Darmstadt: to found their own research company.

They worked on it for eight years. Henco, for example, looked over Charles Weissmann's shoulder in Zurich, the ace of Gentechnik, who was the first one -- working for the laboratory company Biogen -- to clone the wonder drug interferon.

Then, for three years, Henco was employed by the chemical giant BASF in Ludwigshafen, "to get the most necessary thing from industry".

The three young researchers do not doubt that they will establish themselves in the booming biomarket. Their lead in scientific knowledge is too large, they say, for them to fear the mammoth firms in chemistry and pharmacology -- Bayer, Hoechst and Company naturally already long ago are mightily committed to the biotrip. Also, the markets which Diagen is primarily targetting are small and very specialized -- but for this reason no less attractive.

Juergen Schmaucher is a specialist in the genetic analysis of plant diseases. Forest damage from acid rain can be diagnosed long before it can be detected by conventional methods.

The Diagen founders had no trouble finding investors who were convinced of the economic utility of their research capacities. Their financiers are:

- The Dueren manufacturer of laboratory chemicals, Macherey & Nagel,
- The venture capital company "Innovative Duesseldorf" -- a subsidiary of the Duesseldorf City Bank,
- The Munich Techno Venture Management, a venture fund financed, among others, by Bayer, Daimler, Mannesmann, and the German Bank,
- Henco's Zurich teacher Charles Weissmann, and
- The California venture financier Moshe Alafi, who already is one of the founders of the internationally successful firm Biogen.

In addition to the 4.2 million marks of original capital which the Diagen corporate members were able to supply, the province of Northrhine-Westphalia is providing a subsidy of 2 million marks from its bioengineering funding program. The Rhine-Ruhr region wants to take its place as a high-tech area not only next to the Neckar area. But ministerial president Johannes Rau also wants to show what's what to the research minister at Bonn. Heinz Riesenhuber in fact wanted to take away from Northrhine-Westphalia its bioengineering prize possession: The bioengineering department at the Juelich Nuclear Research Facility -- highly regarded in expert circles -- was supposed to be moved to the Society for Bioengineering Research (GBF) in Braunschweig, a society that is financed by the federal government and by the province of Lower Saxony.

Rau balked and Duesseldorf is now running the bioengineering department in Juelich under its own authority without federal aid -- successfully, it appears. Indeed, Juelich plays a role in the second Duesseldorf biocompany which has just been founded: Rheinbiotec. The top manager there is the Dutch microbiologist Cornelis P. Hollenberg who is doing gene research on yeasts at Duesseldorf University. Professor Hermann Sahm, who works in the Juelich bioengineering department, is cooperating with Rheinbiotec as a consultant.

In Duesseldorf, they are also successfully accomplishing what Heidelberg already practiced by way of example -- the combination of state subsidized major research facilities, the university, and industry. Nevertheless, Professor Hollenberg does not want to disclose what major enterprises will participate in Rheinbiotec. But rumor has it that the chemical conglomerate Henkel and Krupp Construction are interested.

The professor corporations are happy to accept money from the big ones, but they do not allow themselves to be bought completely by the industrial giants. Two years ago, many managers of the chemical and pharmaceutical industry were quite smug about admonitions that the major enterprises were excessively reserved towards the upcoming bioboom. "We'll just let the small fry go ahead, and if they are successful, we will simply buy them together with their entire know-how," -- this and similar arguments were then current on the board meetings of big business.

But the small fry are not letting themselves be swallowed. Their capital demand for startup is relatively small, the supply of interested investors in the meantime is so large that the professors can choose to whom they wish to give a minority share.

For Knox is still unlocked. But long ago its treasures have not been available to everyone.

8348
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BIOTECHNOLOGY

ERRATUM: This republished from JPRS-WST-85-033 of 6 December 1985 to place it under its proper category.

BRIEFS

DM 6 MILLION FOR BERLIN MEMBRANE RESEARCH--All functions of the human body such as respiration, digestion, or muscular motion occur in the extremely thin membrane which surrounds every biological cell. In order to track down more precisely this elementary life process, the German Research Association created the special research area 312, "Directed Membrane Processes." By 1987, about 6 million marks are to flow into this interdisciplinary project. The participants are physicists, chemists, and biochemists of the Free University, Technical University, and of the Fritz Haber Institute of the Max Planck Society in Berlin. One could expect that the charge separation occurs in the first nanosecond and that, in the next nanosecond, the two charges are again reunited. However, such is not the case in biological reactions. The forward reaction takes place very quickly, about in 1 nanosecond. The backward reaction is about 100,000 times slower, which means it takes hundreds of microseconds. Since the charge transport is directional, the result is a membrane that is charged negatively on the outside and positively on the inside. This directionality in chemical reactions is achieved by imbedding the reaction systems in complex proteins. The structure of the membrane proteins and the processes at these membrane proteins are analyzed in the special research area. Its main objects are the chloroplast membrane, the membrane of optically active bacteria, and of receptors and pulse generators at the nerve ends. Furthermore, one tries to develop molecular machines from extremely thin synthetic membranes. This can be done without protein, if it is possible to produce membranes which have a different charge inside and outside. For this purpose, oily water-insoluble molecular structures are equipped at their two ends with two head groups that are water soluble and that are of different sizes. Under suitable conditions, these molecules can be assembled to form spherical membranes (vesicles). Such nonsymmetric membranes are a first step towards the design of artificial systems, which can perform directed membrane processes. One day they will utilize sunlight, will directionally transport drugs, and will be able to influence nerve reactions. /Excerpts//Solothurn CHEMISCHE RUNDSCHAU in German 3 May 85 p 16/ 8348

CSO: 3698/11

NEW PRESIDENT AT TRANSGENE--Paris - The genetic engineering firm, Transgene, whose headquarters are in Paris and laboratories in Strasbourg, has a new president: Paribas Bank, one of its stockholders, announced October 14 that Raymond Maurice Doumenc, also president of French Cement, will succeed Robert Lattes. The decision to replace Mr Lattes, who is increasingly occupied with his duties as director in charge of Paribas' "venture capital" operations, was made during a baord of directors meeting October 11. The appointment of Etienne Eisenmann as general manager was confirmed. Transgene, which will also benefit from a fresh transfusion of capital, was created in 1980 by several groups: Paribas, Elf Aquitaine, Moet Hennessy, AGF and BSN. Its genetic laboratories have already received international attention for their development of treatments against rabies and hemophilia. They have just begun work on AIDS. [Text] [Paris AFP SCIENCES in French 17 Oct 85 p 82] 9825/12899

CSO: 3698/111

COMPUTERS

SCIENTISTS, SITES IN NETHERLANDS ARTIFICIAL INTELLIGENCE WORK

Rotterdam NRC HANDELSBLAD in Dutch 31 Oct 85, Supplement pp 1-2

[Article by Bas den Hond: "The Emergence of the Expertise Machine. Artificial Intelligence in the Netherlands"]

> [Excerpts] Limburg should get a Knowledge Systems Research Institute (RIKS). That is what the Cognitive Information Science Commission wrote to Minister Deetman in June. To give luster to Limburg's ambitions, a symposium on artificial intelligence (AI) will be held next Monday in Maastricht. American AI prophet Edward Feigenbaum has been secured to express the necessary optimism. But how far along are we in the Netherlands in developing AI?

When asked, an expert system can state why it is requesting certain information or explain what rules it used to reach a conclusion. This ability to inform and explain has turned out to be very important in practical use. The people who use an expert system take it more seriously if it does more than just give forth its wisdom like an oracle.

That did not stop the information scientists at Delft Technical University from naming their expert system DELFI. One of those scientists was Peter Lucas, who has just become associated with the Center for Mathematics and Information Science (CWI) in Amsterdam and is working there on setting up a program in AI, in cooperation with Delft among others. They intend to work mainly on expert systems, "just because there are already important applications for those. In other sectors of AI there are fine ideas to be sure, but they are not usable in practice."

Businesses have shown an increasing interest in AI in the past year, and according to Lucas it could turn into an economically valuable industry for the Netherlands: "We possess expertise in all kinds of fields here, that is one of the things we trade in. So a ready-to-go expert system in a given field could be an important product." And people who deal in expertise do not need to be afraid that the expertise they have sold will immediately be copied by pirates in a video recording or something: "Expert knowledge is dynamic, it is constantly changing. Somebody has to keep the knowledge in the computer up to date, otherwise it decreases in value."

Ambitions

At the CWI they intend to work not on creating specific systems but on expanding the technological capabilities. And although the staff is small (there will shortly be two permanent people, plus a few advanced university students), the ambitions are large. "As far as quality goes, we are not behind the Americans, though we are in resources available."

Among other things Lucas wants to work on developing better user interfaces, the software that makes the user and the expert system intelligible to one another. The ideal of a computer that understands ordinary human language and replies in the same way is still far off. It is possible for a computer to formulate a grammatically acceptable sentence on the basis of the concepts it has available, but the subtlety of human language is far beyond it. Indeed, that is one of the areas where Lucas says the ideas are fine, but where the applications are still far off.

Another part of an intelligent interface program like this is that the computer acquires a knowledge of the expert system's own capacity, so that a question that goes beyond the actual subject of the program is recognized as such and does not lead to nonsensical responses. Finally, an expert system should not only respond to questions but also independently draw conclusions from information and then provide them to the user or take action on the basis of them. A good program able to monitor a process in a factory has the advantage over people in any case that it does not panic. And in Delft the cooperating hospitals are studying whether an expert system might not be able to inspect the data on patients stored in the computer. It could diagnose sicknesses that patients have without the doctor's being aware of it, for instance beause they were admitted to the hospital for something entirely different.

Finally, one goal is to deepen the knowledge that expert systems possess. They have to be given background information so that they can not only draw a conclusion but also tell more about it. Lucas: "The machine can indeed tell how it arrived at the diagnosis of 'flu' but not that it is caused by a virus, nor in turn what a virus is. If we could change that, you could use an expert system in a totally different way."

These are all things that are in the works. Are the achievements in AI not disappointing after the promises that came out of America 20 years ago? Way back then we already had Eliza, a program that could imitate a psychotherapist astonishingly well, although one that would only discuss the last thing the patient had said. A bit later came SHRDLU, a program that knew all there was to know about a world made up of colored blocks and, as long as you were not interested in anything but that, could carry out assignments there and provide information about the situation and about its own actions. Should the thinking machine not have arrived long ago?

Lucas: "There are two currents in AI. The first seeks to describe the human mind with computer programs, the second seeks to develop computer software that handles information better. In the United States the distinction has never been very sharp, and they also influence one another a great deal. You may be able to imitate human behavior with systems, but even psychologists no longer find the idea that you can imitate thoughts very interesting."

"It is a queer American trait to play down problems, to present things as being better than they are. Even with expert systems. I have still never come across a book that tells precisely how to go about this. Sure, there is a lot known about the principles, but beyond that each person has to find their own way. That is a problem we have to do something about in Europe: we are working on such a book here."

Poor Information

"What an expert system is still far from being able to do," says L. Siklossy of the Free University, "is this, an example that my family doctor in America gave me: Monday morning a mother calls him up. 'Doctor, my child is awfully sick!' Of course she says that, she wants his complete attention. He starts to ask questions. 'Does the child have a fever?' 'Yes, a terrible fever.' 'What is the temperature?' She did not measure it, but she does not want to look like a bad mother, so she thinks of something that is sure to be high: '118 degrees!' And now the doctor has to give a diagnosis."

One of the projects that Prof. Dr. L. Siklossy is starting at the Free University is using expert systems to deal with poor quality information. His starting point is his experience that there is more poor information in the world than good.

Dealing with imperfect information is hard enough even for people. Just try moving to the Netherlands and finding out how to deal with the tax system. "And for weeks I did not know that the super market was closed on Monday mornings, until one day I found myself in front of the locked door." Siklossy was called to the Free University in January 1984 as the first professor of artificial intelligence in the Netherlands. That makes him the only veteran in this field in this country, having been involved in the developments of the past 20 years at Carnegie Mellon University and later the University of Illinois, among others. So he did not come to the Netherlands for the money: Dutch universities are not in a position to hire away this sort of expertise. "I come from Hungary and wanted to live in Europe again."

The Free University too has a small group of people working on AI. There are three important projects: creating systems--robots, for instance--that cooperate to solve a problem; creating an intelligent interface through which data bases can be consulted; and getting expert systems to deal with poor information.

For the last two of these a computer program needs not just the usual number of practical rules, but also some kind of model of the user, either a permanent model in its memory, or one that it creates itself in the course of a dialog. Siklossy: in the case of a data base this kind of interface can assume that the questioner does not know certain things. If for instance the data base contains airline rules and prices, which would be useful in a travel agency, then the interface might ask: "Could you leave a day earlier, because that would fall in another season, and it would be cheaper then?"

"An expert system that has to receive information must determine in one way or another what the quality of that information is. Take the example of the family doctor: he could ask something about the child, the significance of which the mother does not know, and from that he can judge how reliable the rest of what she says is. Just like that doctor, an expert system must sort its information according to reliability but not tell the user right off all the things that are wrong."

The Old Ideal

This however takes us in turn from work on expert systems and other computer programs for business use to the other task of AI, the old ideal of creating machines analogous to the human brain. Whereas work on the former is carried out in mathematics and information science departments (but also in business departments, as at the Erasmus University in the Netherlands), work on the latter aspect is done in psychological laboratories.

At the University of Amsterdam, for that matter, the Experimental Psychology Group is working with the Group on Information Science in the Social Sciences. According to Drs. H. van Someren there is a difference in how professional information scientists and psychologists like him view AI. "One of the complaints that information scientists have about AI is that it is not scientific, that the products are not precisely defined, and that the correctness of the programs is not proven rigorously. We say: if a program is designed to do natural science sums and can do them, then it works. This is an experimental field. The proofs of correctness will all come later of course."

Most of the projects at the University of Amsterdam have to do with how people think and learn. For instance, one project called "Modeling the Solution of Problems in Thermodynamics" is supposed to lead to a description of how students with a basic knowledge of the natural sciences solve problems in the field of energy. After some training it turns out that thinking out loud gives a good idea of how problem solving proceeds. The intention is that the system's thinking out loud should be a good predictor of the student's thinking out loud.

A project closely related to this is the "Thermodynamics Helper." This will be a machine that displays a problem and all kinds of aids on a screen, such as a notebook, a calculator, and vessels, pipes, and valves to describe a system that heat circulates in. The Helper should be able to intervene whenever the data typed or drawn in show that the student misunderstands something.

The way it intervenes can vary, just as one teacher may have a completely different way of correcting mistakes from another teacher. That makes this kind of Helper not just a potential aid in teaching but also a good--because neutral--instrument to investigate how effective various teaching methods are on this point.

And that is another important difference between the information scientist's artificial intelligence and that of the psychologist: for the latter AI is both a research tool and an end in itself.

That is very true of Dr. E. Hoenkamp of Nijmegen Catholic University. Although he is a mathematician himself, the programs he writes deal with information in a way that would quickly make an expert system break down.

"A program that can say something needs an awful lot of information about both sides in a conversation. Elsewhere here at the Catholic University three people are working on programs to produce language, complete with a voice synthesizer so that you can hear it. In my own section we are working on various things, including how conversations proceed, the change in attitude that occurs during a meeting."

"We would for instance like to know how it happens that you usually size up people in an instant: whether they are nice, what their attitudes are. Those attitudes then form the basis for communication, while they are changing at the same time."

We are still far from having a computer imitate that sizing up. But in some situations a program can predict how people will react. That does not mean to say that practically the same program is running in their heads as in the machine, whether in LISP or in some unknown, biological programming language. But at the present time the program with which the computer performs that feat is the most exact description we have of the thought processes inside our head.

Hoenkamp shows us a program that imitates a well-known psychological experiment. The subject has to do something and is told by the experimenter that he has an outstanding score. He believes that he scored well and that in general he is very good at that sort of task. On the screen the symbols representing those beliefs light up. If the experimenter now tells the subject that he actually lied about the test results, the subject no longer believes that he did well but still believes that he is good at that sort of task.

What Hoenkamp likes so much about the program is not that it does what a real human being would do in that situation. It is the freedom he has to change the order of the questions and to introduce all kinds of other factors on the screen. This lets him invent other experiments. Whether the program also accurately predicts the subjects' behavior in the new experiments is only of secondary interest.

AI in Business

A few companies in the Netherlands have AI technology on the market. The oldest and largest is LISP-Systems, founded in 1984 by automation expert Peter van Lith. Three people work there. They have used a shell (a kind of expert system where the expertise still has to be added) that they developed themselves to produce systems for twenty businesses and concerns. In the Netherlands the petroleum industry and financial world are especially interested. Banks for instance can use expert systems to evaluate requests for credit. An expert system from LISP-Systems costs 200,000-300,000 guilders.

Development time is around one day for each rule in the system, and the number of rules ranges from 60 to 100.

In Rotterdam the Artificial Intelligence Technology Transfer Foundation (AITT) has been active for the last 6 months. The board includes Prof. Dr. D.S. Bree of the Erasmus University and Prof. Dr. L. Siklossy of the Free University. The Foundation provides consulting services based on the knowledge available at those universities.

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CSO:3698/120

FACTORY AUTOMATION

DEVELOPMENT, USE OF ASEA'S SWINGING ARM ROBOT IN SWEDEN

Vasteras ASEA TIDNING in Swedish No 3-4, 1985 pp 12-17

[Article: "Swinging Arm Robot"]

[Text] In the fall of 1984 Asea introduced its new IRB 1000 swinging arm robot. Faster, better, cheaper--these were the exciting comments that were heard. Crowds of interested onlookers gathered at the Asea booth at the Robot 84 exhibition in Goteborg.

At the same time, Asea's robot division celebrated its 10th anniversary. Today automation is no longer a dirty word, synonymous with taking people out of production, but more of an instrument for improving profitability. In addition, a robot frees people from monotonous and sometimes dangerous work.

The design and performance of the swinging arm robot are unique. There are many reasons for this, some of which are described in this article. Another great advantage of the Asea concept is the great number of standardized accessories, which provide flexibility during operation.

The new robot created enormous interest and was called a new robot concept for assembly work.

The first reference installation with the IRB 1000 was at one of Asea's own workshops for the assembly of auxiliary contact units for relays at the Asea Control subdivision. The robot, which is equipped with multiple grippers, assembles seven parts in just over 30 seconds. The assembly unit also includes equipment for welding, marking, testing, and other operations.

Some of the interesting assembly projects are the following:

> A line for assembling cylinder heads at Volvo in Skovde. In addition to Asea's IRB 1000 and IRB 6 robots, the order also included hoppers, grippers, tools, feeders of various types, and an Asea Master system for monitoring and control.
>
> An assembly unit for the subassembly of gear boxes at Volvo in Koping. The unit consists of an IRB 1000 with traveling movement. The order also included a pallet storage unit, a conveyor,

a vibration feeder, and other equipment.

In the Netherlands, Asea is working with two turnkey projects for assembling valves. One of the projects involves four IRB 1000 robots, several hoppers, multiple grippers, and power drivers. Here, too, control and monitoring are accomplished with an Asea Master.

An IRB 1000 is being used in France to assemble keyboards.

Asea Robotics is extremely positive about its own future and estimates that it will deliver just over 150 IRB 1000 robots in 1985.

IRB 1000--Stages Of Development

The six degrees of freedom provide total freedom of movement. They may be divided into two groups: three degrees of freedom are needed in order to position the robot arm at a given point in space and three additional degrees of freedom are needed to position the robot arm at a given angle. Consequently, when the IRB 1000 was in the development stage, the problem was divided into two independent tasks: an arm with three degrees of freedom for changing the angle of the robot arm and a triaxial mechanism for moving the arm to any given point in space. The solution to the first problem was a rotate-incline-rotate movement that was extremely compact and required little room, considering its high degree of versitility. The second problem was much more closely related to the problem of high acceleration/retardation, combined with high precision. At first, all precision requirements were ignored in order to make the robot arm move as rapidly as possible.

Figure 3a shows how the arm can be moved in space without the need to add any significant amount of extra mass. Four stationary motors pull the arm by steel cables to the desired position in such a way that all cables are always taut. The arm swings in this way, with the top motor as the center. Of course, the problem with this solution is stretching of the cables and the lack of the ability to absorb compressive stress. Thus, the next step was to introduce elements that could deal with both compressive and tensile stress. This also made it possible to eliminate one motor. The result, shown in figure 3b, is three motors with ball-and-screw transmission. The pattern of movement is the same, but the mass-moment of inertia has been increased for greater precision.

The problem that now arose was that the design required universal suspension mountings at all six mounting points. The combined effect of any possible play was so great that achieving sufficiently high precision was an unrealistic goal. Thus, the next stage of development was to make the movements independent of one another. Figure 3c shows how the up-and-down movement accompanies the right-to-left swinging movement. Both these movements are accompanied by the in-and-out swinging motion. This increases the mass-moment of inertia additionally, but since the drive systems for the first two motions are placed extremely close to the center of rotation and the center of gravity of the

robot arm is also at the center of rotation, the increase in mass-moment of inertia is minimal. In fact, the mass-moment of inertia is only 10 percent higher than in the original concept. The precision, on the other hand, is higher.

By this stage, the basic idea was clear and an experimental model could be developed (figure 3d). This model lived up to its expectations and met the performance requirements that had been set. Professional designers could now plan the development of a final product (figure 3e). By this point, about 15 percent of the total development costs had been used.

Theory Behind Speed Of Swinging Arm Robot

The model shown in figure 5 is used to study the relationship between acceleration and the moment of the motor. The relationship between the moment and the acceleration of a rotating shaft is $M = J \times \phi$, where M is the moment, j is the moment of inertia, and ϕ is the angular acceleration. The model shows that the moment of inertia exists on both the high-speed side, J_M (motor), and the low-speed side, J_R (robot arm). The motor is linkied to the robot arm by way of the gear box, which has a gear ratio of U. The robot arm is also affected by a static moment, M_S.

The relationship is as follows:

$$M_R = J_R \times \phi + J_M \times \phi \times U^2 + M_S.$$

Solving for ϕ, we have :

$$\phi = \frac{M_R - M_S}{J_R + J_M \times U^2}$$

It follows from this that, in order to achieve a high angular acceleration, the following conditions must be met:

The moment of the arm, M_R, must be high;

The static moment, M_S, must be low;

The moment of inertia of the robot arm, J_R, must be low;

The moment of inertia of the motor, J_M, must be low;

The gear ratio, U, must be low.

If a larger motor with a higher moment, M, is chosen, then the moment of inertia, J_M, also increases. In addition, the gear ratio, U, must be large enough to provide sufficient moment to the robot arm, since the relationship between moments is the following:

$$M_R = M \times U.$$

What remains is to find a robot configuration that has a low moment of inertia, J_R, and a low static moment, M_S.

Swinging Arm Robot

The arm of this robot hangs in the direction of the gravitational field. This makes the static moments, M_S, low. In addition, the masses are concentrated around the center of rotation, P, which provides low moments of inertia.

Another advantage is that the closed frame permits extremely rigid main shafts (1, 2, and 3). The design also has been optimized, so that the moment of inertia and rigidity are the same for the main shafts. The advantage of this is that the contour tracking is much better than with other robot configurations.

The robust design and the fact that all bearings are of the roller type provide a robot with high precision and good repeatability.

The result is a robot with:

High speed;

High precision;

Good repeatability;

Good contour tracking.

Systems Philosophy

In addition to the fast swinging arm robot, Asea also has a program of peripherals that are specially developed for the IRB 1000.

Until now, the cost distribution at an assembly installation has been about 30 percent for robot equipment, 10 percent for standard peripherals, and all of 40 percent for specially designed peripherals and tools.

With its new concept, Asea wants to change these figures around, so that about 65 percent of the costs will go toward standard products and only 20 percent for special equipment.

Using more standard products will also reduce the total cost because there will be less installation and design work.

According to Asea's own estimates, programming and installation times will be about 25 percent lower than in previous installations.

Asea now has four main standard modules that have been produced especially for use with the IRB 1000. In addition, of course, the previously introduced visual system (the "seeing" robot) is used in assembly applications.

The Multigrip 1000 has up to six individually operating gripping meehanisms that are controlled by the robot's software. The grips are pneumatic, double acting, and can have three or two fingers or work by vacuum grip. The Multigrip 1000 can also use tools such as Asea's own power driver.

The power driver (IRBA 1001) is a light, compact driver unit designed for driving screws up to size M 4. The driver also can be equipped with an automatic screw feed, for example from a centerboard feeder. During assembly, the tightening and depth of the screw are monitored. The power driver can be operated with the multiple grip or tool changer or it can be mounted directly on the revolving plate (in the wrist) of the robot.

The pallet storage unit (IRBM 1001/1002) can be used both for input and output storage. It is especially suitable for components that must be stored separately or that are difficult to feed in.

The storage unit, which is designed specifically to fit in the working area of the IRB 1000, comes in two different pallet widths--300 and 600 mm.

The pallets are the only parts in the storage unit that must be designed specifically for each component, but they are often produced in a simple, inexpensive process (such as vacuum-shaped plastic). The storage system has its own Asea PC-40 system, which is preprogramed on delivery. When an assembly unit is turned on, all programming is done by the programming unit of the robot.

Fast Track 1000 provides a traveling movement and can be used as a seventh axis of movement for the IRB 1000. It is servo-controlled and is available in lengths up to about 11 meters.

The working space of the IRB 1000 is increased significantly by the traveling movement. This is advantageous when an assembly unit must be made larger (need for space) or if the robot must be used at several adjacent assembly stations.

In addition to Asea's own peripherals, other standard products such as vibration feeders, elevator feeders, hauling tracks, and others may be easily integrated into a system (see figure 9).

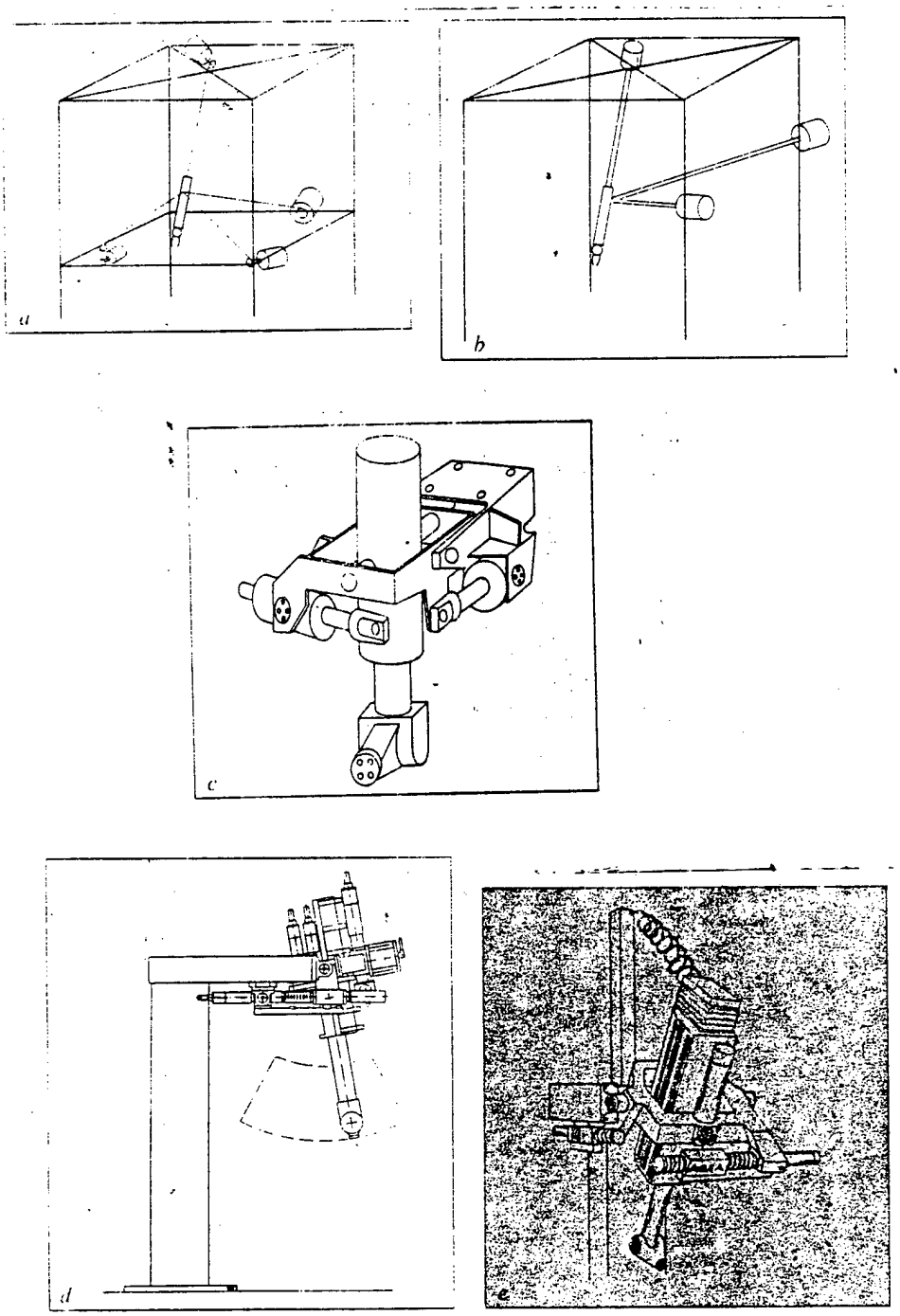

Figure 3. Robot development. Progress of the IRB 1000 robot from basic idea to design drawing.

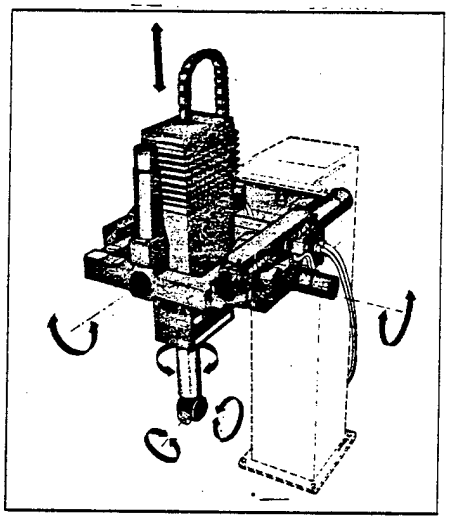

Figure 4. Asea's basic IRB 1000 robot with six electrically controlled shafts for movement. It is designed especially for assembly work, but can also be used in other applications, such as gluing, burring, and arc welding.

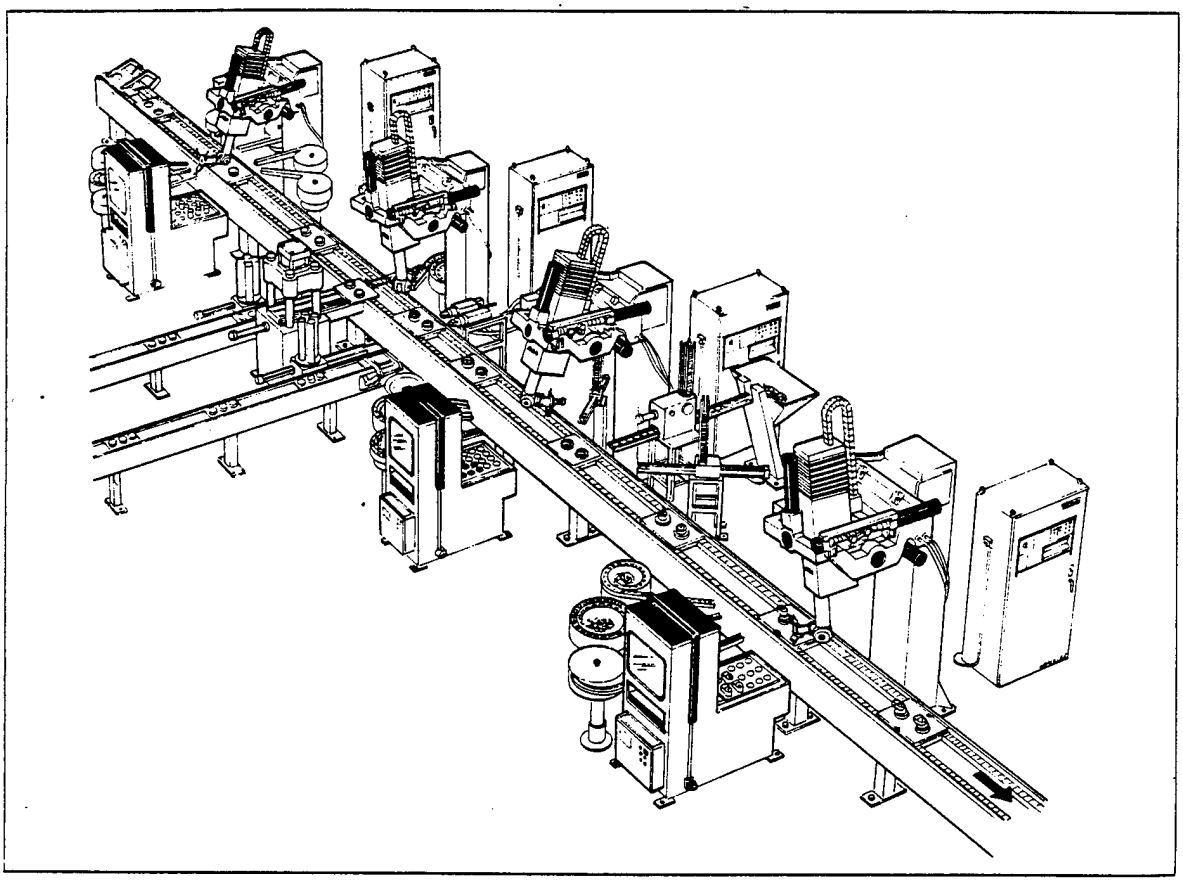

Figure 9. Assembly line with Asea's robots, gripping devices, and storage units in combination with other peripheral equipment, such as vibration and elevator feeders, in a system used to assemble cylinder heads in the automobile industry.

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FACTORY AUTOMATION

EUROPEAN COOPERATION SOUGHT IN MACHINE TOOL INDUSTRY

Kalmthout INDUSTRIE in Dutch Sep 85 pp 29-30

[Article by Piet Salens: "The Challenge: Specializing and Gaining Volume"]

[Text] Our machine tool manufacturers are facing one of the greatest challenges in their existence. The lack of strategic management and a lag in technological development have dealt a blow to the European machine tool industry from which many will not recover. Only the best will survive. The challenge is to specialize and gain volume. The handicaps are our individualism and a lack of familiarity with the market.

Within a few weeks, the EMO will open in Hanover. It is the most important world trade fair for the metallurgical industry. In an area of over 155,000 square meters, 1,800 exhibitors will display the most recent developments in the field of machine tools.

Even though machine tool manufacturers are a minority, they form the core of the entire metallurgical industry. They make the machines which make machines. The development and problems of this sector thus set an example for the entire metallurgical sector and in fact for all of Europe's traditional industry.

In the 1950's and 1960's, the pace-setters for the industry were primarily European. Today, however, our manufacturers face constant pressure from the Japanese, who are capturing an ever-increasing share of the market. There has been real havoc in some cases. In traditionally strong countries such as France and Great Britain, the industries have been virtually reduced to mere ciphers. Only Germany has thoroughly recovered.

Belgium has been justifiably proud of its participation in the EMO fair in the past. In spite of its small size, Belgium has made some outstanding contributions. Now, however, we have less to boast of. Our machine tool sector has also received some serious blows. Some companies have been obliged to withdraw from the field, while others have endured a worse fate and gone bankrupt. The list continues to grow: Mondiale, Raskin, Demoor, Pegard. How long can Jones & Lamson continue? Although some companies--including Mondiale 81, Pegard II and Hymec (formerly Raskin)--have been reestablished, the sector is badly weakened.

Strategic Thinking

Exactly what has gone wrong? L. Van Den Noortgate, director of WTCM [Scientific and Technical Center for the Metallurgical Industries] states: "We have sufficient technology at our disposal, and there is no shortage of qualified people. Basically, it is management which is at fault. There is a lack of strategic thinking in Europe. We have hailed to target and develop a specific market segment. An additional handicap for our manufacturers is that none of them is big enough: production capacities and manufacturing runs are too small."

The Japanese have certainly better prepared themselves. As long as 15 years ago, they saw a market developing for small NC [numerically controlled] lathes before there was a real demand. The Japanese developed and marketed products that gradually penetrated the market and gained momentum. They did the same with machining centers.

These were only small standard machines which had not been modified according to customer specifications. The Japanese began with the premise that standard machines could be used in 80-90 percent of all cases. Controls were standardized and all manufacturers grouped themselves around FANUC. This enables them to produce in large runs, with a sharp reduction in manufacturing costs.

"They are cheap and flexible machines that will not last 50 years. The Japanese have made a product with short-term reliability which will last for a certain time and soon wear out with intensive use. Due to the low cost, though, it is soon written off," says L. Van Den Noortgate.

This explains why the Japanese now corner the market in mass production and European manufacturers only come into their own where nonstandard products are concerned.

Is It Time for Cooperation?

Europe can still rise to the challenge. The European itself remains a large one and therefore is not to be neglected. There are also many buyers who still prefer European manufacturers because they are nearby and more reliable. The service aspect is therefore an important asset, and one in which the Japanese often fall short.

L. Van Den Noortgate comments, "We can only truly match the competition when our manufacturers cooperate more fully. The production quantities must be larger, we must work out our own standards, and a far-reaching standardization more aimed at European needs is necessary. Furthermore, the market segments should be more precisely defined. This is in fact what the Japanese do."

The EEC has already conducted several studies to determine what is needed for machine manufacturers to become more competitive with Japan and the United States. Invariably the studies point out the need for more cooperation and

standardization. The motivation to communicate with other companies, however, is not yet very great. Regrettably, it will take more time.

"It really comes down to repeating things over and over until we get some response," says Mr Van Den Noortgate. "EEC projects such as Esprit [European Strategic Program for Research in Information Technologies] and Brite [Basic Research for Industrial Technology in Europe I have not yet been joined by any machine tool companies. Various methods are possible, though. They can learn from one another without necessarily being direct competitors. They can also be related companies. Mondiale, for instance, learned much from Pegard about machine element connections for the design of its new lathe. A good fit without scraping or adjusting made it possible for timers to be set beforehand."

Another example of cooperation and standardization is to be found within the FMS [Force Measuring System], which is developing quite differently from what was expected. One of the most important problems here is the tremendous cost of peripheral equipment which often surpasses the investment in processing equipment. If only European manufacturers could agree to standardize the pallets they want to use in FMS systems, such interchangeability would be an enormous competitive advantage.

In addition to this cooperation between machine manufacturers in the fields of mechanics, production techniques and communications, there should come a second area of standardization to achieve cooperation in electronics, particularly in controls. One of the mainstays of the Japanese success is that nearly all manufacturers standardize their products according to one manufacturer of controls: FANUC.

Something similar could also be possible in Europe. Siemens is on the right path and is now catching up with its R&D backlog. In fact, from the European point of view Siemens should almost be imposed as a standard. There should be interaction, however, with machine manufacturers on the one hand opting for Siemens, and Siemens, on the other, marketing competitive products. For FANUC is not resting on its laurels, but launching one new and greatly-improved version after another.

Revolution

Even though the sector has been badly weakened, all is not lost for machine tool production in Flanders. On the contrary, some companies have picked up the gauntlet and are fighting back. They have all recognized the need for radical change. Our machine tool manufacturers are going through a real revolution. This becomes obvious when visiting workshops, which sometimes look more like building sites, and in seeing the effective application of new ideas and concepts.

In this series we will present a portrait of five Flemish machine tool manufacturers who are making their way: LVD [Lefebvre, Vanneste, Dewulf] Mondiale 81, Haco, Soenen, and Machinefabriek Herentals. This shows just the current status. The present outlooks and ideas of these companies are

far different from what they were 5 years ago. By 1990 they will have become completely new factories.

The series will end with an exclusive interview with N. Nakashima, managing director of Yamazaki Europe. This company actually forms part of the Flemish machine building industry since its headquarters is in Haasrode. Of primary interest, however, is the fact that it represents the Japanese strength and viewpoints, from which we still have not learned enough.

[Box] INDUSTRIE spoke with:

- L. Van Den Noortgate, director of the Scientific and Technical Center for the Metallurgical Industry (WTCM), Louvain
- R. Dewulf, delegate manager, LVD, Gullegem
- D. Naessens, head of R&D, LVD, Gullegem
- A. Haemsm delegate manager, Mondiale 81, Vilvoorde
- N. Lietaert, general manager, Mondiale 81, Vilvoorde
- R. Demarez, delegate manager, Haco, Rumbeke
- H. Gheysen, head of engineering department, Haco, Rumbeke
- L. Hoorelbeke, managing director, Machinefabriek Herentals
- N. Soenen, director, Soenen, Roeselare
- N. Nakashima, managing director, Yamazaki Europe, Haasrode
- J. Aelbrecht, sales department general manager, Yamazaki Europe, Haasrode

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MICROELECTRONICS

SIEMENS' 'MEGABIT' SUBSIDIES IN DANGER DUE TO TOSHIBA DEAL

Riesenhuber Angered

Hamburg DER SPIEGEL in German 29 Oct 85 pp 43, 45

[Unattributed article: "Subsidies--Surprising Offer: Research Minister Leans on Siemens--No Government Funds for a New Chip Development?]

[Excerpts] Siemens head Karl-Heinz Kaske had invited Research Minister Heinz Riesenhuber for a promotional visit to his firm in Munich. But the invitee felt he'd been dumped on, and declined.

And not only that: Riesenhuber wants to eliminate 320 million marks that Kaske had believed were safely in the receipts column.

The Research Minister has basically lost any desire to use tax money to foster a multi-billion-mark project that was making headlines last year: the development of a superchip that would teach the Japanese respect. Since then Riesenhuber has begun to suspect the Ministry's money could indirectly push Japanese research forward rather than German.

In October 1984 Siemens and the Dutch Philips firm had decided to catch up on the Japanese and American lead in development and production of semiconductor memories. Both firms announced a common "megaproject," the development of a 1-megabit chip and a 4-megabit chip.

These chips consist of fingernail-sized sicilium wafers on which one million and four million units of information respectively can be stored. The "knowledge" stored on a 4-megabit chip corresponds roughly to the contents of a paperback book.

To "make its contribution as a leader in world research," Siemens decided to invest around 2.2 billion marks, while Philips put up 1.5 billion guilders. Both firms also put in successful calls to their governments. Bonn eased Siemen's investment decision with the award of a 320-million-mark grant; the Hague was willing to contribute about 170 million marks.

But this summer, Siemens suddenly announced the conclusion of a cooperative agreement with the Japanese firm Toshiba for licensing chip-production

processes. According to Siemens, the deal was to accelerate the megaproject considerably. "What in-house development can't do quickly and cost-efficiently," commented the trade journal VDI-NACHRICHTEN, "will be acquired by purchase."

But this is not the way Riesenhuber wanted his research policy to be interpreted. He is annoyed because he feels Siemens gave him insufficient information about the Japanese connection during the negotiations for the 320-million-mark subsidy.

Officially, the decision to cancel the multi-million-mark injection will be made only next spring.

But Riesenhuber is speaking with Dutch Economics Minister Gijs van Ardenne about the megaproject already this week. And party comrades in parliament are encouraging the minister in his intention to distance himself from Siemens.

In the most recent session of the budget committee, the Union delegate responsible for the research budget, Dietrich Austermann, complained that big firms like Siemens are drawing too much from the federal government. Siemens reports 1.4 billion marks in interest earnings, and so probably cannot complain of a lack of liquid funds. So there's no need for research subsidies.

Netherlands' View

Rotterdam NRC HANDELSBLAD in Dutch 31 Oct 85 p 11

[Article by Wubbo Tempel: "Megabit Relationships"]

[Text] The relationship between Siemens and the West German government is in difficulty over the Megaproject. The cause is Siemens' cooperation with Japanese chip giant Toshiba on a part of this project, which is being supported by the West German government. DER SPIEGEL, the West German news magazine, reported that officials at the Federal Ministry for Research and Technology were annoyed about that. The officials themselves did not deny that.

Just this week Dutch Minister of Economic Affairs Van Aardenne visited West German Minister of Science and Research Riesenhuber. One thing they discussed was the Megaproject. For this project Philips and Siemens are cooperating to develop a new generation of memory chips. They hope in 1989 once again to be among the leaders for this kind of chip, which accounts for over one third of the total chip market. In addition, the technology acquired on the project will find its way into almost everything the companies do.

Both firms are making huge investments in the project: Siemens 2.2 billion marks and Philips around 1.7 billion guilders. Because of the importance and size of the project both governments are providing support as well. Over a year ago when the project officially began, the Dutch government promised up to 190 million guilders. The German government was to provide up to 320 million marks.

Note that the Megaproject is a broader concept for Siemens than for Philips. The two companies are working together on the generation of chips due in 1989. For Siemens that is the four megabit dynamic chip, for Philips the one megabit static memory chip. The two chips are equally complex and can be produced with the same technology. (A static chip does not have to renew its information continuously, as a dynamic chip does, but in return it has one fourth the memory capacity.)

Siemens' Megaproject includes not only this generation of chips but also the one preceding it. For Siemens that means the one megabit dynamic chip that is to come on to the market at the end of 1986. It is in regard to the work on this chip that the German officials are unhappy.

To speed up this chip, Siemens signed a cross license with Toshiba. Siemens "buys" the production technology for the one megabit dynamic chip from the competition in return for Siemens expertise and an unspecified amount of money.

Late Stage

A portion--a small portion--of that 320 million mark sum was earmarked for Siemens' work on this earlier generation. And here Siemens has suddenly linked up with Toshiba! The officials are angry: "Siemens doesn't need any research support (Forschungsforderung) if it just buys the expertise, does it?" commented a spokeswoman sharply. What is mainly responsible for the anger, the spokeswoman says, is the fact that Siemens only informed the Federal Ministry at a late stage of its plans with Toshiba.

This could lead to complications because the contracts between Siemens, Philips, and the two governments still have not been signed. They are to be signed simultaneously. Procedural rather than substantive matters are responsible for the delay so far, according to the Dutch Ministry of Economic Affairs. The Ministry will not provide any other details about exactly how the support is being finalized.

Experts

The delay in the contracts makes difficulties particularly for the independent experts who have to monitor the progress of the project. They cannot find out anything officially.

The West German spokesman is formally non-committal, even after the talk with Van Aardenne: "Nothing has been decided yet." Philips, Siemens, and the Dutch Ministry of Economic Affairs claim that the matter is simply still under negotiation. Philips has a very good argument: "Surely a government would not want to take back its work on such an important point?"

The question of whether or not the money was spent for research in the strict sense of the word seems to be academic. The intention after all is that Siemens and Philips achieve their goals. If that is only possible with help from the competition from Japan, then that is just the way it is.

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SCIENTIFIC AND INDUSTRIAL POLICY

BELGIANS EXAMINE GOALS OF EUREKA, ESPRIT, BRITE

Brussels INDUSTRIE MAGAZINE in French Oct 85 pp 116, 120-121

[Article by Franco Menozzi: "Eureka: An Opportunity to Seize"]

[Excerpts] The Eureka program, launched by President Mitterrand, offers an unexpected opportunity for European companies. In Belgium, and more particularly in Wallonia, there are companies which cannot let that opportunity slip.

The unconditional support of industrialists is needed to realize a technological Europe. The question, however, is whether the Eureka project, proposed by President Mitterrand, will be able to provide the structure upon which this technological Europe hinges, or whether it only constitutes the European response to the SDI [Strategic Defense Initiative] project, the elitist pretensions of which are no longer concealed on the other side of the Atlantic.

Siren Song

Although of military inspiration, SDI is in fact a vast scientific program affecting every sector of advanced technological research. The enthusiasm which SDI arouses not only in many American but also in European researchers is not misleading--it is a vast technological challenge which the United States has issued to the world. The American administration knows very well that it has to call on the world's best specialists in every field if it wants to bring projects to be undertaken to a successful conclusion. Consequently, research centers involved in SDI have made numerous proposals to the most brilliant European researchers. Desmond Smith from Edinburgh, perhaps the foremost optical computer expert in Europe, has announced that he intends to cross the Atlantic with his entire team to profit from the generosity of SDI. The Americans have also quickly established contacts with European high-tech companies. Accordingly, MBB [Messerschmitt-Bolkow-Blohm] in Germany, Selenia in Italy, British Aerospace in Great Britain and Matra in France have already shown great interest in collaborating with U.S. partners. It is obvious that SDI is the opportunity dreamed of by many industrialists to invest large sums in advanced technologies which will form the basis for the industrial porcess of the next 20 years.

Eureka

And will Europe during all that remain a simple partner participating in these technological developments without directly reaping the fruits, as the previous lact of reaction s-ems to indicate? Last 18 April, Francois Mitterrand threw quite a stone into the sea of European inertia by presenting a project baptized Eureka.

Above Bureaucracies

The French Eureka approach is a novelty in the realm of the planned economies of European bureaucracies in that it circumvents both domestic and European administrative authorities. The project's philosophy is to have industrialists and scientists meet, sector by sector, to design the research programs themselves. The success of Ariane is often recalled at the Elysee. The work will be assigned to the most competent contractor, regardless of nationality. This is radically new talk for European leaders too accustomed to sectarian quarrels concerning compensation. Needless to say, procedures in which only competence and efficiency count have long been natural practices in Japan and the United States, where they have demonstrated their particular efficacy.

Aside from good intentions, it is necessary to question Eureka's feasibility. It goes without saying that the creation of a technological Europe requires a modification in the Treaty of Rome. European authorities who feel excluded from the development of the project recall that they still remain the frame of reference and consistency which cannot be easily disregarded in any endeavor aiming at the building of Europe. It is true that the development of technological breakthroughs without constant attention to the development of potential markets risks bringing about some disappointments. That is why in Brussels they strongly insist on the necessity of a synergistic approach combining other joint [European] policies, i.e., the agricultural, monetary, commercial and economic policies. The commission has also been reminded that there already are scientific programs in progress, such as ESPRIT [European Strategic Program for Research in Information Technologies] (technology and information), BRITE (introduction of advanced technologies in traditional industries), and RACE [Research and Development in Advanced Communication Technologies for Europe] (telecommunications0 which could serve as receptive structures for Eureka.

Variable Geometry Research

The principal characteristic of Eureka is precisely that is allows rapid concerted action. Therefore, one wonders whether the integration of this program into Europe's slow bureaucratic structures is possible.

Considering its high ambitions, it is difficult to conceive Eureka's financing within the framework of the EEC's present budgets. Moreover, some countries faced with serious economic difficulties are not ready to invest heavily in this program. That is why Jacques Delors recommends a variable geometry plan. To that end, the commission in Brussels will have to modify certain articles of the Treaty of Rome so that it can more easily disengage itself from the unanimity required in making a decision related to Community policy.

In the meantime, more than informal contacts have been established, as the Matra example reaveals. In a recent interview, Jean-Luc Lagardere, its chief executive officer, somewhat annoyed the French Government by declaring to anyone willing to listen that he would not choose between SDI and Eureka. His company is interested in both projects and he is open to both American and European collaboration if this would help his company prosper. It should be said that the U.S. Air Force has already ordered several billion French francs worth of electronic arms systems from Matra and negotiations with those in charge of SDI have already started. The entourage of Hubert Curien, the French research minister, points out that the government will by no means oppose collaboration between the United States and French companies, but that European interests must be safeguarded.

As opposed, to his colleague at Matra, Jean Martre, director of Aerospatiale, says no to SDI, but shows unreserved enthusiasm towards Eureka.

Nor does business trail in the field. In the beginning of July, Matra Harris Semiconductors (MHS), a subsidiary of Matra (51 percent) and the American company Harris (49 percent), and the Italian Government corporation SGS [General Semiconductors Company] announced a cooperative agreement to jointly accelerate their advanced microelctronics research. On the other hand, Matra concluded, still within the scope of Eureka, two joint research agreements with the German group MBB (Messerschmitt) for the construction of telecommunication satellites.

Convince Industrialists

On 17 and 18 July 1985, the European Congress for Technology was held in Paris accordance with the June decision of the council of Milan. On this occasion, President Mitterrand announced a 1986 credit grant of 1 billion francs to launch the program. The countries participating in this congress (the EEC members plus Austria, Finland, Norway, Sweden, and Switzerland) all welcomed the French initiative and most of them have gone beyond the stage of good intentions by making concrete proposals. In a white paper the British suggest the creation of a Eurotype project (a kind of Buy European Act) for the products of high technology and an acceleration in setting European standards for a whole series of industrial products. In addition, Britain and Italy have claimed tax incentives for the establishment of European companies. Bonn, for its part, would like to see a biotechnology sector develop within Eureka.

In 3 months, the French idea has gained much ground, but the hardest part remains to be done: to convince industrialists to fully engage themselves in this technological Europe. Eureka also offers a chance to many small and medium-sized high-tech industries which possess scientific and technological potential, but whose financial means somewhat restrains desirable developments.

Wallonia has such companies which, in the Eureka framework, could play a leading role in a large European collaboration. To that end, they have to demonstrate their intentions and discard the reservation which is too common to some of our industrialists and academics, as well.

After the American Congress votes on SDI, things will certainly go very fast on the other side of the Atlantic. Considering that Japan is not accustomed to lagging behind technologically (as Tsukuba has recently shown), it is up to the Europeans to assume their responsibility, and fast.

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CSO: 3698/1006-A

SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH RESEARCH, TECHNOLOGY MINISTER CURIEN ON EUREKA

Rotterdam NRC HANDELSBLAD in Dutch 23 Oct 85 p 7

[Article by Wubbo Tempel: "Pragmatic Coalition of Industry and Government"]

[Text] "We have seen a true pro-Eureka movement come to life," says French Minister of Science and Technology Hubert Curien contentedly. Since April, when the Franch plan for European technology was launched, he has traveled to the capitals of 18 countries, among them the countries Finland and Turkey. Tomorrow he will visit with his Dutch colleagues minister for economic affairs, Van Aardenne and Minister of Education and Science, Deetman in the Hague, who together are in charge of the Ducth technology policy.

We are interviewing the Minister in his Ministry building in Paris. On almost every wall there are pictures and plaques hanging commemorating successful Ariane-missile flights. The modern art on the wall also is not abstract, the outlines of missiles and airplanes are clearly recognizable in the paintings. Curien himself has had a lot to do with the Arian program: from 1976 until 1984, when he became a minister, he was president of the National Center for Space Exploration. Curien (60) admits that a number of unclear points still exist about the Eureka plan.

But he himself has a clear-cut idea, i.e., the pragmatic cooperation of industries, subsidized by their governments, for each technological project there should be an ad hoc agreement, no central guide-lines, no central treasure. Government funding is really necessary. Curien has high hopes, that other Eureka countries will also see it this way.

Government funding

Curien: "I am against a joint Eureka fund. A government is much more motivated to participate financially in the projects it is interested in. For example, a project in which Dutch, German and French companies participate, would be funded by the governments of those three countries."

Question: Is government funding necessary? British Prime Minister Thatcher is against that.

Answer: "Of course governments must contribute. The programs mean important developments and carry a certain risk for the companies involved. I do not want to define the amount of funding I don't have a magic figure, but an average portion in the neighborhood of 50 percent seems reasonable to me. On the average. For those projects which result in the immediate marketing of concrete products, the customers could pay more, of course."

Question: France itself has allocated 1 billion French francs for Eureka for the year 1986. Critics say that this not "new" funding, but that these are simply old, existing funds that are being re-allocated for a different purpose.

Answer: "That is an interesting point. You can ask that question about Eureka, but the same question would apply to SDI." (The Minister himself starts speaking about the American Strategic Defesne Initiative, although the French side has always officially denied that the launching of Eureka in April was a direct answer to SDI). "Sometimes it is believed that the funding allocated for SDI is entirely new funding. That is not true. On the contrary: if it is true that our funding comes from an existing well-known funding program, then these are funds which had already been designated for research. And, from whichever angle you look at it, the budget for research and development in France rose last year by many billions of French francs. (In real costs the budget rose by 4 percent to 42 billion French francs). Let's look upon Eureka's one billion as one of those 42 billions. You may find that to be weak reasoning. But without Eureka I would have been less able to plead for that increase."

Eureka has been civilian, non-military, in nature from the start. Curien explains: "We want to federate the whole of Europe with the plan. Because of the position taken by some countries, we didn't want problems beforehand. Sweden and Switzerland, for example, would not have joined if military projects had been included."

Question: But isn't it strange to leave the arms industry out of it? SDI specifically assists the arms industry.

Answer: The Minister smiles and points out that the French arms industry does profit in this manner: "Ah-ah. In our country there is no industry that is exclusively military in nature. Who are the ones that are working for the French army? Industries like Matra, Aerospatiale, Dassault. But Aerospatiale also manufactures Airbus airplanes, and Matra manufactures cars and computers. Eureka is going to be the opposite of SDI, which has a military program, with possible spin-offs for non-military uses. Here in this country the projects are non-military. But it is conceivable that there will be a certain military spin-off for the industries, those high-tech industries and also for the arms industry."

And further: "I don't mean to say that France is not contemplating the opening of joint military programs, independent of the Eureka project."

Question: There is a fear at times of French dominance or the dominance of French industry.

Answer: "It is our sincere wish to make it Eureka a European affair. Because we have taken the initiative, it is sometimes thought that we want to be the bosses, the satraps, of this program. That isn't true. We don't want to make it a franco-french adventure nor a franco-german one, something about which we are also being reproached at times."

Curien is willing to make large concessions in order to secure Dutch participation: "I can see that it is a problem for a country like the Netherlands, where comparatively speaking there are a number of very large industries. I am thinking of Philips, Unilever, Shell. In a Eureka project in which Philips participates, the Philips part would have to be funded by the Dutch government."

"If that should be too heavy a burden for the Dutch government, others could contribute. We, for example. A part of the Philips activities could then, for example, be manufactured by the Philips laboratories in France--or in Germany. Of course, this is something we still have to decide on. But I would not like that to become an obstacle beforehand. Because it needn't be that."

Question: So there are no French nationalistic motives present?

Answer: "Oh, yes. Definitely. The national interest of France is that in ten or twelve years a joint European economy will come into being. We are sure, that if European countries try to stimulate their economic development independently of each other, they will fail. The national interest of France is a strong France in a strong Europe. Because a strong France in a weak Europe--is not possible. And neither is a strong Germany, or a strong Holland. We need each other's markets and funds."

Question: Has the French attitude, as far as this is concerned, changed?

Answer: "Certainly."

Question: Why?

Answer: "Face the facts. Presently there is an excellent government in France, ha ha."

Question: Would it not be easier to work together with American or Japanese industries?

Conqueror

Answer: "That is a difficult issue. It isn't good politics to be strongly negative a priori. We will have to study it case by case. But to go for real cooperation, that is, indeed, somewhat dangerous. We see large Japanese firms invading our continent. We want to react to that invasion. If we do that jointly with the conqueror, our force de frappe would certainly be somewhat weakened. American and Japanese interests are very clear. European interests are starting to become clearer now too. But let us first of all give European interests a chance to manifest themselves."

Question: What do you expect to come out of Hannover, where the next Eureka conference will be held on 5 and 6 November?

Answer: "A number of issues will become clear there. The fact that we arranged a date and a place has first of all accelerated the processes. But the conference will also be fruitful. I expect promises of financial participation in the program by several countries. As far as that is concerned, I am on the same wavelength with my colleagues from Germany, Belgium, the Netherlands, and Italy. But I can not yet fully assess how my colleagues will react."

"Furthermore, I expect that we can announce a half to one dozen projects. In any case, I know that to be so from what is going on here in France. Six of them projects are completely finished, and another six are nearing completion. I an not including the initiatives in which France is not participating."

"Finally we will discuss the organization of the program. We want to make Eureka an issue of interest to industrialists, and therefore, I want to defend it from the beginning against any form of structured organization. It should not become a kind of rain, which the governments allow to fall down on the industry."

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SCIENTIFIC AND INDUSTRIAL POLICY

NORWAY SUGGESTS PROJECTS FOR, COMMENTS ON EUREKA

Ten Proposals Made

Oslo AFTENPOSTEN in Norwegian 6 Nov 85 p 8

[Article by Gunnar Selgard]

[Text] Hannover, 5 November. Secretariat or no secretariat, and the degree to which the government shall finance the research projects. These were among the most important issues when ministers from the 18 Eureka countries met on Tuesday for two days of conferences in Hannover, West Germany.

This second meeting of the Eureka ministers was intended to give the organization a more solid structure and define its objectives. Minister of Foreign Affairs Svenn Stray and Minister of Culture Lars Roar Langslet represented Norway.

The conference was motivated by a proposed declaration of principles which was drawn up by officials from the 18 countries involved and the Common Market Commission. Two proposals were presented with regard to the secretariat question: A group of smaller countries, including the Scandinavian ones, desire the establishment of a small, but flexible, secretariat. Another group of larger countries feels that no position regarding an independent secretariat need be adopted at this juncture. They feel that the question should be put aside until more experience has been gained. Some of the larger countries, including France, are highly sceptical of the establishment of a secretariat. There is a fear in other circles that a Eureka without a secretariat could easily develop into a purely French/German affair.

The Scandinavian countries have stressed that they do not wish to see the formation of a new international bureaucratic colossus, but rather a small and effective secretariat. We do not wish to build up adminstrative structures which parallel those which already exist in Europe. We want the Eureka secretariat to make use of the service and experience which the Common Market commission already possesses. We also want the make-up of the secretariat to reflect the fact that Eureka includes both member and non-member nations of the Common Market.

Norwegian Proposals

On the first day of the meeting the ministers presented their countries' research project proposals. Norway made ten proposals, six of which involve foreign partners with whom contact has already been established. Norwegian concerns and institutions involved in the projects include Norsk Data, Statoil, Det Norske Veritas, Elkem, Kongsberg Weapons Factory and Standard Telephone and Cable Factory.

A number of Norwegian companies have agreed to participate on the condition that the government assume some of the costs. A highly-placed source in the Norwegian delegation says that the government is prepared to provide financial assistance. Some of this assistance will be in the form of funds which are normally provided for research purposes, while additional assistance will also be provided. However, our source indicates that it is too early to say anything regarding the amounts involved or the share of the overall burden which the state is going to shoulder.

The Norwegian attitude towards financing is a typical middle-of-the road standpoint. The proposed declaration of principles wisely avoids any direct reference to financing, since the countries involved have expressed a wise range of views with regard to the financing issues.

Commentary on Cooperation

Oslo AFTENPOSTEN in Norwegian 7 Nov 85 p 8

[Article by Gunnar Selgard]

[Text] Hannover, 6 November. The newly-formed European cooperative research organization "Eureka" adopted a declaration of principles pertaining to the group's efforts and determined a more definite organizational structure in the course of a two-day conference of ministers in Hannover. The foreign affairs and research ministers from the 18 nations involved also gave the go-ahead signal for the first research projects to be carried out under European direction.

Eureka, which was conceived by France and launched in April of last year, has developed rapidly. However, according to conference sources, it still remains to be seen whether Eureka will actually become a reality. The 18 countries involved vary greatly in terms of their motivations for joining and the extent of their involvement, a diversity whose effects, both beneficial and adverse, could soon become apparent in the organization's efforts.

With regard to the much-debated issue of the establishment of a secretariat, the ministers in Hannover agreed that a secretariat should be set up. The intent is that it will be small and flexible, and that it will not develop into another large international bureaucracy. It will in all likelihood be situated in Brussels and work closely with the Common Market Commission. A committee of experts will draw up a detailed proposal regarding the make-up of the secretariat before the end of January of next year.

At the end of the meeting Norwegian Minister of Foreign Affairs Svenn Stray said that the concept of a large European free-trade area exerts a strong influence on Eureka, and finds expression in the declaration of principles. There is agreement regarding the desirability of public funding for the research projects. However, this does not necessarily mean that all of the countries involved will provide public sector funding. Great Britain is sceptical of this notion.

Norway - Common Market

Eureka will strengthen the European integration process and, in the case of Norway, lead to closer contact with the Common Market. However, according to Stray this contact will involve purely practical collaboration and will not lead to a revival of the Norwegian membership issue.

Stray said that research which would be connected to the American SDI space weapons research program was not considered during the conference. No understanding has been reached regarding the American plan, and Eureka is not meant to be an alternative to it. However, there is broad support for the notion that Eureka can help to strengthen Europe's efforts in high-tech research and counterbalance corresponding research on the part of America and Japan.

Eureka's coordinating body will consist of the conference of ministers, with representatives from the governments of the 18 countries involved along with the Common Market Commission. A high council of officials from the participating nations and the Common Market will be set up, one of whose duties will be to prepare the ministerial conferences. A secretariat, which will function as a clearing center to gather and spread information, will also be set up. The secretariat will actively assist companies and institutions in making contacts for Eureka projects.

Regarding the Norwegian research projects which were proposed at the Hannover conference as so-called "categorical projects," some interest was generated by the proposed cooperation between Norsk Data and the French Matra Company to develop an extremely fast minicomputer. Italy expressed interest in the project. Another project in which Norway is involved in the same category is the German-inspired Eurotrac program for studying air pollution in Europe. Finland, the Netherlands, Austria and the Common Market Commission are also involved in this project. A number of other countries, including Denmark and Sweden, have also expressed interest.

A number of other projects are presently being evaluated by the Norwegians as well.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRG VENTURE CAPITAL FIRMS FLOURISH, BUT LACK CUSTOMERS

Munich INDUSTRIEMAGAZIN in German 15 Oct 85 pp 146, 149, 150, 153

[Text] Over the years, some 30 venture capital firms have accumulated about DM 750 million. But so far, just under one-fifth of that money has actually been placed.

Since the early 1980's, when the first venture capital firms--patterned on the American model--were set up in this country, the wave of new companies established by venture capital investors has hardly abated. Meanwhile, an increasing number of savings banks, banks and insurance companies have become involved in venture capital financing (see table). But there evidently is a lack of innovative firms that warrant the risk.

"In the FRG, the corporate venture, i.e., firms providing capital, predominates," according to Axel Schmidtke of the IC Investment Congress GmbH, Munich, "and the investors are primarily pursuing strategic goals." Investors in venture capital in this country are not so much interested in quick profits than in a "window on technology" in the hi-tech area.

Here, as in the United States, where they constitute only about 5 percent of venture capital investments, the number of hi-tech projects is very small. This is why only about 20 percent of the DM 750 million accumulated so far has been invested in innovative firms.

On the other hand, not enough investments are made by the more profit-oriented private sector, which could also finance projects below the hi-tech level. "At this time, we haven't yet sufficiently tapped the private venture capital investor," Schmidtke notes. However, that may change with the amendment to the Company Partnership Law that is under consideration.

CAPITAL AND SERVICE FROM ONE SOURCE
Venture Capital Firms in the Federal Republic of Germany

	Name of Venture Capital Firm; Executive	Total Capital (mill. DM)	Start of Business	Investors	Venture Management	Partnership Policy	Portfolio Firms
	a	b	c	d	e	f	g
1.	Bayrische Wagnisbeteiligungs-gesellschaft mbH (BWB) [Bavarian Venture Capital Ltd] Lena-Christ-Str.2 8022 Gruenwald Tele.(0 89)64 18 52 54 Dr. Wilhelm Zirngibl	20	1/85	11 Bav. banks, 2 insurance companies	Dr. W. Zirngibl, G. Henrich	Support of regional firms, establish-ment & restructur. in high-growth sectors through public & silent partnerships; DM .5-1.0, excep-tions possible; usually only minority partner-ships; no seed financing	Partnerships in microelectronics, mech. engineer'g, precision eqpt., packaging & metal processing industry about to be completed
2.	BIH Innovations- & Handelsgesell-schaft mbH [BIH Innovations & Trading Co. LTD], Uhlandstr. 179/180, 1000 Berlin 12 Tele.(0 30)8 82 67 11 Helmut Rausch	5 dir., 5 H. Rausch pers.	end 82	private capital	Helmut Rausch, Hans Kliesing, Dr. Peter Hage-mann, Dr. Thomas Lueskerath	Seed financing & turnarounds, with management support, in information & communications tech-nologies, new media, environmental tech-nologies	7 portfolio firms, incl. GEVA, Con-trol Eqpt. for Printing Machines

	a	b	c	d	e	f	g
3.	Citicorp Venture Capital Beratungs-gesellschaft mbH [Citicorp Venture Capital Advisory Corp. Ltd] Neue Mainzer Str.75 6000 Frankfurt Tele.(069)13 66-6 70; Dr. Wolfgang Schaaff	140	4/1/84	Citicorp	own	Growth-oriented firms & management buy-outs, partner-ships betw. DM1-5 mill., no restric-tions on sectors	Several partner-ships in diverse sectors, incl. in electronics
4.	Deutsche Gesell-schaft fuer Wagnis-kapital (WFG) [German Venture Capital Corp.] Ulmenstr. 37-39 6000 Frankfurt 1 Tele.(0 69)71 00 40 Karl-Heinz Fanse-low	150	1975	WFG "old": 29 German credit inst. (first fund); WFG "new": Deutsche Bank 30%, Dresdner Bank 22%, Commerzbank 18%, West-Landesbank 18%, Bayrische Landesbank 12%	own	Medium-sized firms with good success prospects in growth markets of all kinds	43 partnerships in many sectors totaling over DM 50 mill. in FRG, USA, Britain
5.	Gfl. Gesellschaft fuer Industrie-unternehmen mbH [Industrial Enter-prises Ltd] Guenther-Quandt-Haus Seedammweg 55 6380 Bad Homburg v.d.H. Tele.(0 61 72) 40 43 01; RA Klaus Schweickart	30	late 1983	Quandt Group	Dr. Gert Koehler, Dr. Busse, Dr. Heibl & US partner	"Window on techno-logy" investm. for product diversifi-cation of Quandt Group (so far about 70%, dependent on automobile cycle)	10 portfolio firms in microelectronics, medical & laser technology

a	b	c	d	e	f	g
6. Hannover Finanz GmbH, Beteiligungen & Kapitalanlagen [Hanover Finance Co. Ltd, Partnerships & Capital Investments] Leisewitzstr. 37b 3000 Hannover 1 Tele.(05 11)2 80 07-0; Albrecht Hertz-Eichenrode (spokesman), Hans Peter Schandelmaier, Joachim Simmross	70	5/7/79	Hannover Finanz is part of the General Liability Assn. of the German Industry Mutual Insurance Ass., the Hannover Re-Insurance AG. 84.7%, Liability Insurance Assn. Ltd 15.3%	own	No restrictions; participation betw. DM 2-10 mill.	15 partners
7. Innovationsfonds des Landes Berlin, Senator fuer Wirtschaft & Arbeit [Innovation Fund of Berlin Land, Senator for Economy and Labor] Martin-Luther-Str. 105 1000 Berlin 62 Tele.(0 30)7 83-1; Mr. Durand (7 83-81 69, Mr. Struck (7 83-83 88)	27	9/82	Berlin Land	Investments managed by Berliner Industriebank	Innovative, techn.-oriented small and medium-sized firms or undertakings & establishments in Berlin; otherwise no restrictions	31 Berlin firms, partic. in microelectronics, electronic data processing eqpt, software for process control, medical techn., robotics

	a	b	c	d	e	f	g
8.	Inno-Wert Fonds Gesellschaft fuer Unternehmensbeteiligung mbH & Co., Erste Beteiligungs KG [Inno Value Fund, Venture Partnership Corp. Ltd. & Co., First Partnership Ltd], Ostfeldstr. 46A 3000 Hannover 71 Tele.(05 11)52 50 53; Dr. Horst Meyer, Uwe Gabbert	10.2	11/83	Open capital market (K&W)	Schmuecker, Kainz, Funke & Partners, Gummersbach	No restrictions, average particip. DM 1-4 mill.	Biotechnik GmbH, Langer Elektronik, Polymer-Chemie, Laserinnovation GmbH, Teco Elektronik
9.	INOBEG Innovations-Beteiligungs GmbH [INOBEG Innovations Partnerships Ltd.], Erhardtstr. 12 8000 Munich 5 Tele.(0 89)2 01 20 88; Dr. Hans Rottenkolber	open	1985	Private capital invest., starting at DM 20,000	Dr. Hans Rottenkolber, E. Sommer, G. Zieroth	Start-ups, expansion of existing firms, spin-offs. Partnership limit 15%, microelectr., industrial electr. & robotics, optoelectr. & laser, telecommunic. & data techn., electro-medical eqpt., energy	Under consider.: chirurgical bone drills (battery-operated), photo lasers, crystal lasers, process control & operat. data collection system
10.	IVCP S.A. International Venture Capital Partners, 35 Rue Glesen Luxembourg; Genes, Gruendungsberatung & Management Service GmbH;	40	1983	Heraeus, Metzler Bank, Ibach, & other foreign insurance companies, PM, industrial enterprises banks,	Genes & Investors Industry, London	No limitation. Particip. between DM.5 and 1.5	Portfolio partip.: since April 1985, fund is quoted on Luxembourg Exchange

	a	b	c	d	e	f	g
	[Establishment Advisory & Management Service Ltd], Horbeller Str. 10-14 5000 Koeln 40 Tele.(0 22 34)5 90 76; Dr. Klaus Nathusius, Thomas Kuehr			VC groups and entrepreneurs			
11.	KBG Kapitalbeteiligungsgesellschaft mbH Berlin [KBG Capital Venture Corp. Ltd Berlin], Schloss Str. 36 1000 Berlin 41 Tele.(0 30)7 91 90 35-36; Walter Hasenmueller	10	11/83	Stadtsparkasse der Stadt Berlin West [Savings Bank of the City of West Berlin]	own	Regional companies without sector limitation; particip. between DM .2 and 1.5 mill.	9 investments (silent partners)
12.	Risikokapital-Beteiligungsgegesellschaft der deutschen Versicherungswirtschaft AG (KDV) [Risk Capital Investment Co. of the German Insurance Industry Inc.] Bismarck Str. 105	100	8/84	103 insurance companies	own	Energy consumption improvement for medium-sized firms, investments between DM 1 and 5 mill; no sector limitat.; current internat. investm. opport., among others, in mechan. engineering, electronics, raw material processing and trade	Being set up

a	b	c	d	e	f	g
1000 Berlin 12, Tele.(0 30) 31 00 90; Karl-Theodor-Str. 6 4000 Duesseldorf 1; Tele.(02 11)8 22 11; Dipl.Ing. Werner Eule, Johann Puhl						
13. S-Siegerlandfonds 1. Kapitalbeteiligungsgesellschaft fuer Innovationsfoerderung im Siegerland mbH & Co. [S-Siegerland Fonds, First Capital Investment Corp. to Promote Innovations in Siegerland Ltd. & Co.] Post Office Box 21 07 53, 5900 Siegen; Tele.(0271)7 72 81; Peter Toepfer	5	11/83	Siegen Savings Bank	Overwhelmingly non-inhouse specialists	Partnersh. between DM .2 and 1 mill., not centered on specific sectors, concentrates on image or existing Siegerland companies	Demig Mikrocomputersystems GmbH (measurement & control techn.), Si-tronik GmbH (measurement & control techn, CAD, CAE), Labsoft GmbH (analyses eqpt.), Alfred Bilsing GmbH (production automation)
14. TIG Technologie-Investititons-GmbH & Co., KG [TIG Technology Investment Ltd & Co.), Kurfuerstendamm 209 1000 Berlin 15: Tele.(0 30) 8 82 72 01/02	20	12/7/84	Bank fuer Handel & Industrie AG, Bayrische Vereinsbank AG, BMW AG, Dresdner Bank AG	own & Churchill Grp.	Minority particip. (up to DM 2 mill.) in sectors such as communications & documentation, information processing, artificial intelligence, production techn., materials as well	3 investm. completed, 2 investments close to completion

	a	b	c	d	e	f	g
	Dr. Heinz Uebelhack, Franz C. Helbig					as analysis, measurement & control techn.	
15.	TVM Techno Venture Management Gesellschaft mbH & Co., KG, Barerstr. 9 8000 Munich 2, Tele.(0 89)5 58 79 02; Rolf C. Dienst, Peter Kaleschke, Dr. Hellmut Kirchner	116	10/83	Siemens AG, Deutsche Bank, Daimler-Benz AG, Bayer AG, Mannesmann AG, ZF Friedrichshafen, Koerber GmbH, Austria, Industrieverwaltungs AG, MBB	Matuschka Group, TA Associates, Advent Group, Siemens AG	Automation, process control, bio- & medical techn computers, data bank & transmiss., electronic components, energy techn., communications techn., measurement & control techn., specialty chemicals	8 portfolio firms, incl. AID, Technics, Feinfocus Roentgensystem, ICT Integrated Circuit Testing, Speech design
16.	VC-Gesellschaft fuer Innovation Berlin GmbH [VC Corp. for Innovation Berlin Ltd] Kurfuerstendamm209 1000 Berlin 15; Tele.(0 30)8 82 24 20; Dietmar Gruener	10	12/83	Deutsche Bank Berlin AG 40%, Berliner Industriebank 30%, Industriekreditbank 30%	own and outside specialists	No limitation. Average investment DM .5-2.0 mill.	Toni MFL GmbH (test systems in steel & construction industry, 4 more from measurement & control techn., ADP software development & other services
17.	WBB Wirtschaftspartner Beteiligungsgesellschaft mbH [WBB Industry Partner, Investment Ltd] Berlin, Kurfuerstendamm 93	10&20 lines	5/84	Berliner Bank AG, Berliner Commerzbank AG, Hannover Finanz GmbH, Nixdorf Computer AG, Standard Elektrik Lorenz AG	Hannover Finanz GmbH	New establishments & existing firms, minority partnerships, companies with Berlin supplies	4 partnerships

	a	b	c	d	e	f	g
	1000 Berlin 31 Tele.(0 30)3 24 69 37; Albrecht Hertz-Eichenrode, Joachim Simmross						
	VENTURE BROKERS						
18.	Bera Betriebsberatungs GmbH Jaegerhofstr. 16 4000 Duesseldorf; Tele.(02 11)48 01 06; Contact: Dr. Bopp	10	1980	Private; Max. investment DM 100,000 for typical silent partner	In-house Bera Dr. W. Bopp, Dr. H.-D.Rompel, Dr. W. Schmidt	Partic. biotechn., electronics, robotics, waste processing techn.	Geur Elektronik, ABT Waste Processing Technology
19.	Direktbeteiligungsgesellschaft mbH & Co., Verwaltungs KG, [Direct Investment Ltd. & Co., Management Ltd] Bergstrasse 16 8033 Krailling; Tele.(0 89)8 59 62 71; Hermann Buenten, Alfons Weber	19 in plan'g stage; funds to be increased to DM 50 mill.	1970	some 108 partners, investm. at least DM 100,000	own	No limitations, growth sectors preferred; max. DM 2 mill., min. DM .5 mill; no new establishments	About 15
20.	Don Prohaska Communications Grethenweg 143 6000 Frankfurt 70; Tele.(0 69)68 52 18; Don Prohaska	depends on project	1982	private investors	Don Prohaska & advisors	Patentable techn. for mass market, incl. medical computers & laser technologies; financing of new firms	Inova GmbH, Arid-Patent AG, VWD-Kommunikation, Wenker-Motor, Wendel-Beleuchtung [Lighting]

	a	b	c	d	e	f	g
21.	Gesellschaft fuer Internationale Investititonen & Innovationen mbH [International Investments & Innovations Corp. Ltd], Lidenstr. 39 6000 Frankfurt 17; Tele.(0 69)74 57 86; Alfred Schulze, Dr. Reiner Stemme	open	1981, Berlin branch 1985	Private: direct investm. DM 500,000; portfolio investm. DM 50,000	own	Biotechnology & chemical processing techn., raw materials, materials, electronic systems, information & automation techn., equipment manufacturing	not available
22.	HAITEC-Venture Capital Beteiligungsges. mbH [HAITIC Venture Capital Investment Corp. Ltd], Kurfuerstendamm 53 1000 Berlin 15; Tele.(0 30)8 81 18 80; Dr. Mackebrandt	open	1984	Private	Investitionsausschuss Strauss & Partner Unternehmungsberater VDI-TZ [Investment Committee Strauss & Partner Industry Advisor VDI-TZ]	New firms; founding techn.-oriented firms, partic. in microelectronics, medical techn.	not available
23.	Innovationstechnik Ges. fuer Kapitalsbeteiligung und Finanzplanung Venture Capital GmbH & Co. KG [Innovation Technologies Corp. for Capital Investments &	open	1984	Private, starting at DM 50,000	Outside experts	Estbl. of new firms in several economic areas, incl. medical techn., ADP, ventilation techn.	MLM Moderne Luft- und Mischtechnik GmbH [MLM Modern Air Technologies Ltd], Hamburg, SSDS Subvent Datenbank Systeme, Hamburg

a	b	c	d	e	f	g
Financial Planning Venture Capital Ltd & Co.] Heinrich-Hertz-Str. 15 2000 Hamburg 76; Tele.(0 40)2 27 09 51; Andreas Mueller						
24. Investitions-Gesellschaft Dr. Putsch Markstrasse 32 6200 Wiesbaden; Tele.(0 61 21)30 23 63	Project depend.	1983	Private	Outside	Private placements	Privatplazierung Mid American Long Distance Co.
25. ITB Innova Transfer Industrie-beteiligungs GmbH [ITB Innova Transfer Inustry Participations Ltd] Myliusstrasse 54 6000 Frankfurt 1; Tele.(0 69) 72 95 98; Dr. K.-W. Oepke	Project depend.	1982/83	Private invest.	Dr. Oepke and others	Automation, robotics, information techn., environmental and bio techn., industry joint ventures	Robot-Systeme (FMS) control techn. sewage clarification & filter techn.

Source: Axel Schmidtke, PRAXIS DES VENTURE-CAPITAL-GESCHAEFTES, Moderne Industrie Publishers, Landsberg, as of July 1985.

SCIENTIFIC AND INDUSTRIAL POLICY

NEW CONDITIONS FOR FRG R&D PERSONNEL SUBSIDIES IN 1985

Duesseldorf HANDELSBLATT in German 12 Aug 85 p 1

[Text] The FRG Economic Ministry (BMWi) reports that the Commission of the European Community has approved, after several concessions were made by the FRG government, the total concept of subsidies for research and development personnel in industry. This would clear the road for continuation and further development of a subsidies program that met with much approval in industry and that has been credited by experts with a high rate of efficiency.

The "guideline 1985 of the FRG government program for subsidies to R&D personnel in industry 1985-1986" that was developed jointly by the FRG economics minister and the FRG research and technology minister will be published in a few days in the BUNDESANZEIGER [FRG Government Record].

The BMWi reports that application forms for 1985 can be requested immediately from the Association of Industrial Research Societies (AIF) in Cologne, Bayenthalguertel 23. All firms that submitted an application to AIF last year will receive guidelines and application forms without special request at the beginning of August. The deadline for subsidies applications was extended this year to 30 November. Next year the deadline will again be 30 September.

According to BMWi, the FRG government asserted in the annual economic report 1984 and in the FRG research report that it wanted to adjust aid for research and development in industry more strongly to marketing criteria and, at the same time, wanted to reduce direct subsidies for projects. The essential concern of the new subsidies concept would be to support small and medium-size firms conducting personal, intensive research in their efforts to adjust to economic-technical structure changes, and to give them additional incentives for economic growth and the creation of new jobs.

Clear Increase of Financial Means

The subsidies concept would provide that the BMWi program for R&D personnel that is in effect since 1979 be extended by another 4 years and be expanded by providing special subsidies for additionally hired R&D personnel, and that this special subsidy be financed from the budget of the FRG research and technology ministry.

The BMWi report further states that the new subsidies guidelines for application years 1985-1988 contain both parts of the program. For either kind of subsidy uniform application forms have been prepared. Those eligible to submit applications for the first part of the program, the R&D personnel subsidies, are, as before, research and development-oriented firms of producing trades and crop producers located inside the FRG business area and West Berlin, in as much as they

--in the past calendar year or for the average of the last 3 years had a business volume of less than DM 50 million and fewer than 500 employees,

--are not owned, at more than 50 percent of ownership, indirectly and/or directly by one or several firms which themselves have an annual business volume of more than DM 100 million or are majority partners in other firms with whom they have a joint total annual volume of more than DM 100 million.

The following changes will be applicable to subsidies conditions beginning with 1985:

--for each firm subsidies will be limited to a total maximum of 6 years.

--In the 6th subsidy year the subsidy rate will be reduced from 40 to 25 percent.

--The costs for regular employees as well as for technical-scientific assistants in R&D work are considered in computing subsidies not in their entirety but only to the amount of 50 percent of these costs.

In implementing these changes the FRG government was guided by the basic consideration that financial aid should have a time limitation; the government also followed recommendations by scientific consultants that the possibilities of abuse of time projections for R&D definitions be reduced.

The second part of the program, supplementary and additional subsidy given by the FRG research ministry, has for its purpose to give incentives to firms to expand their R&D personnel by hiring additional employees. Those eligible to submit applications are firms of the producing trades in as much as they have fewer than 1,000 employees and an annual business volume of less than DM 200 million.

Subsidies for the additional cost of R&D personnel will be granted in as much as this cost is caused by hiring new R&D personnel. Personnel shifts within the firm will not count. Considering the special subsidies in cases where new employees are hired, the subsidy rate is clearly above the increase in personnel costs.

Subsidy for new personnel is given to firms that have up to 1,000 employees and an annual business volume of up to DM 200 million. For firms with less than 500 employees subsidy amounts to 55 per cent of the applicable gross wages and salaries of the newly hired personnel for 15 months beginning with the hiring date. Maximum amount for each firm is DM 250,000 per year.

For firms with 500 and more employees subsidy amounts to 45 percent of the wage and salary costs for a maximum of 12 months and with an upper limit of DM 200,000 per year.

The maximum amounts given above for each year and firm may not be surpassed even if both subsidy programs are used.

The BMWi reports that, compared with previous appropriations, financial means for R&D personnel subsidies in industry will be considerably increased. In the 1985 draft budget and in the intermediate financial plan provisions are made for R&D personnel subsidies amounting to DM 380 million for 1985 and to DM 400 million for 1986, 1987 and 1988 respectively. Subsidies for additional personnel are provided for in the 1985 draft budget for the current year to the amount of DM 55 million, for 1986 DM 145 million, and for 1987-1988 respectively DM 150 million. So far, the AFI in Cologne, acting for the BMWi, has administered the R&D personnel subsidies program in a way that has been acknowledged as unbureaucratic and efficient. Subsidies for additional personnel will also be handled by this independent agency of industry [the AIF]. Because both programs followed uniform definitions and are closely related to each other in their essential elements (such as R&D personnel costs as subsidy object, gross wages and salaries as accounting basis, R&D definition), application for both measures can be submitted to the AIF on one application form.

Personnel costs subsidy and additional personnel subsidy can be used at the same time but are not cumulative, i.e., gross wages and salaries for additional personnel should be used only the context of additional personnel subsidies. In establishing subsidy guidelines the ministries, as before, were especially concerned that application forms contain only necessary information so that employees of the firm who complete application forms do not have to seek help from special consultants.

The BMWi reports that applications will be accepted and subsidy payment made annually, as before, on the basis of the gross wages and salaries of the previous year as paid out for R&D. Applications for new personnel subsidies can therefore be submitted for the first time in 1985 for new personnel hired between 1 September 1984 and 31 December 1984.

Program Offers Stable Calculation Basis

With this new total concept of R&D personnel subsidies in industry the FRG government has clearly indicated that it intends to create reliable conditions for R&D activities in small and medium-size firms. Uncertainties of time and subsidy conditions that have been criticized time and again by employers have thus been eliminated. Firms participating in the program have now a stable calculation basis for the years 1985-1988 and can include subsidies in their medium-range R&D plans better than before.

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SCIENTIFIC AND INDUSTRIAL POLICY

'FLOOD' OF APPLICANTS FOR FRG AID PROGRAM FOR START-UPS

Duesseldorf HANDELSBLATT in German 12 Aug 85 p 1

[Text] More than half of the new Bonn aid program for start-ups that began on 1 August has been "sold out" for this year after 1 week.

The Equalization of Burdens Bank which administers the program had received by Friday of this week approximately 12,000 applications for the 20 percent subsidy promised by the government. At a possible maximum premium of DM 10,000 for the individual applicant, DM 120 million have thus already been tied up. A total of DM 200 million of FRG funds is available for 1985.

The Equalization of Burdens Bank (LAB) considers the high rate of usage an "extraordinary success." It explains the strong interest especially with the attractiveness of the program that, contrary to most aid programs--like the program for personal capital aid--does not grant long-range loans at low interest rates but rather rewards savings made by prospective start-ups and wage earners with a high non-repayable bonus. In the context of a "initial savings agreement" concluded with the Home Bank, subsidy is given to savings and interests at a maximum amount of DM 50,000 for from 3 to 10 years. (Details in our 1 August edition). The personal capital accrued in this way can then be increased with the help of a number of other middle-class programs.

The LAB says that the big success of the program is explained by the strong action on the part of credit institutions for which the enactment of subsidized initial savings agreements is of interest in regard to business activity, 40 percent of the aid applications that have so far been received in Bonn come from, respectively, savings banks, people's savings banks and farm cooperative banks. The remaining one fifth comes from private commercial banks. These institutions credit the initial savings deposits of their customers according to regulations with a basic interest adapted to the basic savings interest rate and with a final bonus that depends on the time of the savings agreement. The maximum capital eligible for subsidy can, under today's conditions, be reached in 10 years with a monthly savings rate of DM 300.

The FRG Ministry of Economics points out, however, that publicity of the credit institutions describing the alleged "greyhound character" of the

program is "exaggerated to say the least." If more than 20,000 aid applications are received this year, the LAB will collect the "surplus" applications and include them in next year's plans. Because the subsidy is paid at the earliest after 3 years of saving and after establishing, or taking control of, a firm, there would be no disadvantages for interested customers by this delay. It is assumed that the program, which is to be in effect until 1990, will be extended next year, if need be, beyond the 200 million limit.

In the 3 years before the first initial savings subsidies will be paid from the FRG treasury, the CDU-CSU Middle Class Association wants to modify one essential point of the program guidelines. Members of this association are concerned that the 20 percent subsidy rewards, on the one hand, the result of private saving activities but that, on the other hand, the bonus, unlike the home construction bonus, is not tax-free but must be taxed as business income. The argument here is that as a result up to half of the subsidy will go back to the FRG treasury in cases where a business is taken over by a new owner. Another point is that for start-ups initial high losses often simply delay tax payments.

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SCIENTIFIC AND INDUSTRIAL POLICY

EC VENTURE CAPITAL TO PROMOTE ADVANCED MANUFACTURING PROCESSES

Duesseldorf HANDELSBLATT in German 20 Aug 85 p 6

[Text] Frankfurt. The EC Commission in Brussels wants to materialize the technological innovation potential in EC countries by way of the Venture-Capital-Idea. For this purpose cooperation is to be enforced between the national European Venture Capital Societies in order to support businesses that are active in the field of "high technology."

Thus the European Venture Capital Association (EVCA) was founded in 1982 which now wants to start work within the Euramtech Ventures project. This project which was established by the British Granville & Co, Ltd and the EC has as its goal to support with the help of venture financing the materialization of the innovation potential of the EC in the field of first-rate technology for manufacturing processes. This would make it possible for European firms to narrow the competitive advantage of Japan and the United States on international markets, and perhaps even to catch up with these counties as G.M. Brasseru of Euramtech Ventures in Brussels optimistically pointed out to this newspaper.

Euramtech Ventures is also known as an institution to European financial institutions which want to support with capital businesses that use first-rate technologies in their manufacturing methods and are also interested in developing an efficient transeuropean system in this field. The management committee of Euramtech Ventures is made up of membership firms from six EC countries, the European Commission and EVCA.

Three member firms of EVCA come from the FRG: Deutsche Wagnisfinanzierung GmbH [German Venture Financing], Industriekreditbank AG/Deutsche Industriebank, Techno Venture Management GmbH & Co Kg.

European machine tool associations also show an active interest in these ideas. After the EC Commission pointed out in a study of European machine tool firms that this branch of industry was faced with the necessity of

raising its efficiency by utilizing to an optimal degree the dimension of the European Community and by making efforts to improve its own structure, Euramtech Ventures was founded with the goal, among others, to demonstrate a commitment to this transeuropean way of thinking and acting. "Support for the project by the EC Commission, participation by Venture Capital firms and the active interest of industrial associations are an important step in the further materialization of the innovation potential within the EC," Euramtech Ventures explains.

The management of the Euramtech project also considers the establishment of a European Venture Capital Association with the purpose of investing in small and medium-size firms that use advanced production technology. It would be the aim of this kind of association within the EC to strengthen cooperation of individual firms and to support their competitive plans on international markets. If the Euramtech test project proves to be a success, the same strategy can then be applied on the level of private industry and in other fields.

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